IN THE UNITED STATES
PATENT AND TRADEMARK OFFICE

Applicant: Douglas W. Biggers

Title: SHUTTER/WINDOW DOOR AND METHOD

CLAIMS

What is claimed is:

1. A shutter system in combination with an architectural feature being one of a door and a window unitized in a rectangular bracket for use in a building opening comprising:

a plurality of plates disposed within the rectangular bracket which can be folded and unfolded, each of the plates having hollow hinge forming longitudinal parallel edges which together form hinged joints;

guide members in the rectangular bracket having tracks for guiding the plates;

extensions with rollers from each of the hinged joints to cooperate with the guide members;

further extensions extending from ends of the plates on no less than every other plate;

each of the further extensions having supporting members with wheel carriers secured at the end of the plate and within a track with yieldable means urging the wheel carriers to put the secured plate in tension to add additional strength to resist bending and impact of the shutter when in a fully unfolded configuration.

2. The shutter system of claim 1 in which each hinged joint includes two hollow hinge members that are substantially

cylindrical, one of the hollow hinge members being formed to slide interiorly of the other hollow hinge member whereby the shutter may be assembled by slidably engaging adjacent plates.

3. The shutter system of claim 1 in which the hinged joints further comprise:

hinge members that are C-shaped in cross-section;

stop members protruding from the ends of the C-shaped cross-members extending inwardly on the larger hinge members and outwardly on the smaller hinge member;

whereby rotation of the hinged joints at the extreme positions of folded and unfolded plates in the shutter is stopped.

4. The shutter system of claim 3 in which one hollow hinge member includes a swarf channel throughout its longitudinal length, the swarf channel being positioned opposite a gap between the stop members.

5. The shutter system of claim 1 in which the plates are a one piece member formed of a single extrusion whereby each plate is interchangeable each other plate.

6. The shutter system of claim 5 in which:

the plate members include an arcuate surface facing concave downwardly; and

at least two longitudinal ribs are extruded along the lower

concave portion of said plate member to provide additional reinforcing strength in tension.

7. The shutter system of claim 1 which further comprises:

means for raising and lowering the plates while they are constrained horizontally within the bracket.

8. The shutter system of claim 1 in which the wheel carriers are disposed at one of an edge and a mid-position of each plate whereby at all times the plates are carried in tension to add additional strength to resist bending and impact and whereby at all times the plates are constrained against lateral displacement by the wheel carriers running up and down the tracks.

9. The shutter system of claim 1 in which the rectangular bracket is proportioned to receive one of a sliding glass door, a curtain wall, and a full view picture window as the architectural feature.

10. A shutter system in combination with an architectural feature being one of a door and a window unitized in a rectangular bracket for use in a building opening comprising:

a plurality of plates disposed within the rectangular bracket which can be folded and unfolded, each of said plates having hollow hinge forming longitudinal parallel edges which together form hinged joints;

guide members in the rectangular bracket having guide inner seats for guiding said plates;

the guide members including guide channel outer blocks disposed between guide inner seats;

extensions with rollers from each of the hinged joints to cooperate with the guide members;

further extensions extending from ends of the plates on no less than every other plate;

each of the further extensions having a removable washer slide guide secured at the end of each said further extension and being constrained within the guide channel outer blocks with yieldable means urging the washer slide guide to put the secured plate in tension, to add additional strength to resist bending or impact of the shutter when in a fully unfolded configuration.

11. The shutter system of claim 10 in which each hinged joint includes two hollow hinge members that are substantially cylindrical, one of the hollow hinge members being formed to slide interiorly of the other hollow hinge member whereby the shutter may be assembled by slidably engaging adjacent plates.

12. The shutter system of claim 10 in which the hinged joints further comprise:

hinge members that are C-shaped in cross-section;

stop members protruding from the ends of the C-shaped cross-members extending inwardly on the larger hinge members and

outwardly on the smaller hinge member;

whereby rotation of the hinged joints at the extreme positions of folded and unfolded plates in the shutter is stopped.

13. The shutter system of claim 12 in which one hollow hinge member includes a swarf channel throughout its longitudinal length, the swarf channel being positioned opposite a gap between the stop members.

14. The shutter system of claim 1 in which the plates are a one piece member formed of a single extrusion whereby each plate is interchangeable each other plate.

15. The shutter system of claim 14 in which:

the plate members include an arcuate surface facing concave downwardly; and

at least two longitudinal ribs are extruded along the lower concave portion of said plate member to provide additional reinforcing strength in tension.

16. The shutter system of claim 1 which further comprises:

means for raising and lowering the plates while they are constrained horizontally within the bracket.

17. The shutter system of claim 1 in which the additional extensions are disposed at one of an edge and a mid-position of

each plate whereby at all times the plates are carried in tension to add additional strength to resist bending and impact and whereby at all times the plates are constrained against lateral displacement by the washer slide guide being constrained within the guide channel outer blocks.

18. The shutter system of claim 1 in which the rectangular bracket is proportioned to receive one of a sliding glass door, a curtain wall, and a full view picture window as the architectural feature.

19. A method for forming a combination shutter system and architectural feature unitized system in a rectangular bracket for insertion into a building opening comprising:

forming a series of plate members with a length governed by the width of the building opening, and having two lateral edges, each edge being tubular with a longitudinal slot to form a C-shaped member, one C-shaped member being larger than a second C-shaped member, the larger having an interior opening sufficient to slidably receive the second smaller C-shaped member to form a hinge between adjoining plates;

providing extensions from both ends of each plate to cooperate with guide members in the bracket to guide the plates;

adding further extensions attached to both ends of the plates on no less than every other plate; and

attaching to the further extensions means to secure within the

guide members and apply tension to the plates using yieldable means that adds additional strength to resist bending or impact of the plates.

20. Installing in a building opening the shutter system and architectural feature formed by the method of claim 19, comprising the steps of:

- framing the rectangular bracket with a frame having a top and sides,
- inserting the combination shutter system into a building opening, and
- securing split shims on the lateral sides of the frame.

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